

## ABSTRACT OF THE DISCLOSURE

5           An apparatus and method for interrogating fiber optic sensors non-intrusively sensing fluid flow within a pipe is provided. The apparatus includes a two-beam interferometer which comprises an optical circuit for generating a series of discrete light pulses that are directed at sensors positioned between pairs of low reflectivity fiber Bragg gratings. The successive light pulses are split into  
10   first light pulses and second light pulses, and the second light pulses are delayed a known time period relative to the first pulses. The first and second light pulses are combined onto a single optical fiber and directed through the low reflectivity gratings and the sensors positioned between the gratings. Reflected pulses from the series of pulses impinge on a photo receiver and interrogator, wherein the  
15   phase shift between the reflected first light pulses from a particular grating and the reflected second light pulses from the preceding grating, for each sensor are determined. Phase shifts from successive pulses for each sensor are compared, and a change in a measured parameter of the fluid is determined.